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# Low-carbon Economy and Low-carbon Food

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## Abstract

This article has analyzed the influence of low-carbon (LC) economy on our country economy, particularly described on the concept of low-carbon food and carbon emissions in Chinese food currently, and explored the importance of the development low carbon food systematically.

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## 1. The concept and background of low-carbon economy

The concept of the proposed low-carbon economy is not far from now which appeared early in 2003 the English Government's official documents. The meaning of low carbon economy is a kind of economic model based on low energy consumption, low pollution and low emission. It is a great progress again following the agricultural civilization and industrial civilization of human society. The essence of Low-carbon economy is the efficient use of energy, the exploitation of energy resources and the pursuit of green GDP. The core of it is the innovation of energy and emission reduction technology, the innovation of industrial structure and institution, and the fundamental change of concept of human survival and development in aims of dealing with a series of environmental issues caused by global warming through the way of improving energy efficiency and reducing carbon emissions.

U.S., EU, Japan and other countries have realized that the low-carbon economy is the very significant strategic for the future development, and have positively planed and arranged in development strategy, economic model, trading mechanism, standard-setting, market access, etc. Under the promotion of the Obama government, the U.S. developed renewable energy and reduced fossil fuels in the proportion of the national energy to promote domestic low-carbon economy rapidly, and seized the opportunities brought by the financial crisis to promote the reform. The EU hopes to build a global carbon

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emissions trading market in order to become the leader and the rule-makers of global low carbon economic development model. On one side the EU could occupy the high moral ground, and on the other hand achieves the de-Americanism of global economy in order to compete with the United States. Thus, to achieve low carbon economy is an inevitable choice for human sustainable development. But the deeper meaning is far from it. This is a new type of industrial revolution, and every country is hoping to grab the right of making market principle, maintaining the discursive power and restricting other countries.

For every county LC economic revolution is a historic opportunity. China as a developing country that has one fifth of mankind and ought to be responsible for human development and ecological environment protection, it can absolutely promote LC economy through international cooperation, energy planning and industrial policies, project aid and technical research, financial innovation, etc. to have the initiative during the economic restructure and the industrial revolution the Industrial Revolution the Industrial Revolution of the world, build a friendly Economic development model, and contribute to the sustainable development and environmental protection. In 2009 22nd of September, while addressing the climate change summit meeting of United Nations, Chinese president Hu Jintao showed Chinese attention to the climate challenge and the position we should take, expressed our responsibility and cooperation view, and stated the strategic direction and the determination to develop LC economy in the near future.

## **2. Low-carbon food and food carbon emissions**

Low-carbon food is manufactured by less simple carbohydrates and more advanced low-carbon technology with the characteristics of low pollution, low emission, low power, low-calorie, low fat during the production, transportation, and consumption. Such as seasonal vegetables without special conditions such as greenhouse, local crop, leave out the transport energy, green food seldom with fertilizers, and food without too much packaging, etc.

For the past three decades, food consumption and structure of urban household had changed greatly in China. Grain and vegetables presented a down trend while other types of food have increased in different levels; especially dairy consumption is the largest. According to relevant statistics, along with the social economic development and the income increase of residents, the average food carbon emission is increasing. The grain consumption's decrease influences food carbon emission pivotally. But while the grains went down, the consumption of meat, eggs, milk products increased. Compared with 1978, 2006, food consumption of urban residents reduced 74.58kg, but the one of meat and eggs increased 40.45kg with indirect consumption 83.85kg, so the latter ones were higher than the former. At the same time, per capita food consumption carbon emissions of urban residents was higher than rural residents', indicating that urban residents' dietary structure and consumption custom are against with reducing food consumption carbon emissions. With the development of urbanization, the rural' entrance to urban city will increase the carbon emissions. Urban residents with higher income prefer the exotic and out-of-season food with beautiful package, home storage of food means more energy consuming, those are all the reasons of high carbon emissions urban residents.

Residents' indirect food consumption carbon emissions are closely related to the people consumption level and the energy efficiency of the whole society. The reducing of carbon emissions of food production depends on the increase in energy efficiency of this part. By comparison, in the past 30 years the energy efficiency in food transport had only small increase. Reducing unit km energy consumption will reduce the carbon emissions of food transport. Food consumption and demand are basic requirements for human being, which are not only related to the national nutrition level and health standards, but also impact on agricultural production resources' use and production structure adjustment. The relevant energy and other

material consumption have a significant impact on the environment. Food consumption behavior of urban and rural residents is in the impact. The influences of urban and rural residents to environment are quite different, in which urban residents' impact on carbon emissions is greater.

### 3. The research of importance of low-carbon food

Prime Minister Wen Jiabao pointed out “the food industry is the human life industry, and also the eternal industry. With the development of the information technology and science economy, the world food industry had achieved substantial progress. New industries are emerging continuously, but food industry is still the first industry in the world's manufacturing. Modernization of the food industry has become a reflection of the life quality and the level of national development”.

From the current situation, energy saving and emission reduction in light industry are still arduous. The Main Pollutant (COD) occupies the 50% of the total industrial emissions. Industrial wastewater occupies the 28% of industrial wastewater emissions. Food, paper, leather and others are the majors of light industry emissions, so that they are the industries with heavy energy saving tasks. Particularly in wine, fermentation, etc. some products are listed in State Department's “Energy-saving and Emission Reduction Comprehensive Work Plan”. This planning specifically mentioned the pollutants emissions standard. By 2011, major industries' COD emissions reduce 255,000 tons than 2007, cut down by 10%. The food industry reduced 140,000 tons. Wastewater decreased 19.5 million tons, reduced by 29%, especially the food industry declined 10 million tons compared with 2007. Food industry has long way to reduce the carbon emissions.

#### *3.1. The development low-carbon food is only choice of China which blends in the economy globalization to satisfy the growing food demand.*

As an agricultural country, we should make the agricultural and low carbon food industry as one of the country's pillar industries after entering into the WTO. Low carbon food industry is not only has high economic benefit, but also consistent with China's national conditions. The development of special economic-ecological agriculture and low-carbon food processing industry will create immeasurable social and economic benefits.

#### *3.2. The development low-carbon food is an important measure for realizing the Scientific Outlook on Development.*

Low carbon food development is a new model for the food industry with low energy consumption, low emission and low pollution. The essence is to improve energy utilization and create clean energy structure. The core is the technological innovation, institutional innovation and transformation of development concept. The development of LC food is not only an important part of the Scientific Outlook on Development, but also the vital approach to practice it and the scientific selection to achieve sustainable development of China's food industry. Through the change of food from the non-sustainably.

#### *3.3. The development low-carbon food industry is the need of modern agriculture.*

Agriculture and food industry have natural relationship. Under the ground of resource shortage, the low efficient resource elements comminuted with the characteristics of single large-scale investment in natural resources must be changed. The same is to the changing the idea of taking grain as the key link, emphasizing farming and despising business, processing on single experiment and producing as

subsistence economy or semi-subsistence economy to realize the change from extensive agriculture to market economy with modern agriculture. To achieve these, it is not only the needs of agricultural development in low carbon, also the urgent demand of LC food industry urgent demand.

#### *3.4. The development low-carbon food is conducive to promoting the industry upgrading.*

The ratio between food and agricultural gross output value is a country's vital symbol of food industry development. In China the ratio is 0.3-0.4:1 and the western region is only 0.18:1, far below the level of 2-3:1 in developed countries. Chinese grain, fruit, meat, eggs, aquatic products all rank the first place in the world, but the processing stage is only 25% while the developed countries are more than 70%. The majority of our equipment and management level are fall behind, and products are of low technological content. Therefore, enterprises should increase the technological transformation efforts, particularly pay attention to the reform of LC technologies so as to put the production of low-carbon manufacturing in every detail, increase the input in the construction e development based on carbon-based energy to sustainable development based on low carbon, we could change Chinese current food production and consumption situation with excessive carbon emissions step by step, and further enhance our food industry competitiveness and safety of Chinese food of hardware and software, enhance technological innovation and major scientific problem, improve technological content of the processed products, develop the deep process, create conditions for the establishment of environmental monitoring and assessment system for the manufacturing process, make efforts to innovate process, control consumption of energy, save energy and reduce emission in order to achieve new breakthroughs and realize the industrial upgrading.

### **4. The food industry achieve the strategic measures of low-carbon**

#### *4.1. Unified understanding, strengthen leadership*

Governments at all levels and departments must unify their understanding, seize opportunities, strengthen leadership and take effective measures to promote low-carbon of the fast food industry development. First, we must realize the food low carbonization as a breakthrough in characteristic food, create agricultural top brands, improve the market competitiveness of agricultural products, and cultivate new growth points of the agricultural economy. Second, set up a leading group of food low-carbon, studying and solving the new situations and new problems in the low-carbon food development, support lower carbonization development policy measures to promote industrial development. Establish and improve the management of low-carbon food agencies, strengthen the management and coordination of food work. Third, incorporate the food low carbonization into the national economic and social development plan, implement the food low carbon development objectives, measures, there is a responsible person.

#### *4.2. Adhere to the scientific and technological innovation, accelerate high-tech applications*

The core of food industry development is low carbon technology innovation, which requires the food industry to upgrade its technology, increase innovation. First, the development of seeds and seedlings for food production provide a number of pest-resistant, wide adaptability and high quality seeds and seedlings resources to meet the needs of food production. Second, develop food fertilizer; promote sound farm manure composting, microbial fertilizer, green manure and permitted chemical fertilizers. Third, develop food feed additives, food additives and food packaging materials. But the precondition is to

protect the environment, conserve resources and ensure food security.

#### *4.3. Culturing leading enterprises, and let them play a leader role in the food low carbonization.*

Focus on cultivating a batch of own brand and outstanding achievements the leading food processing enterprises in terms of low-carbon, in particular, fostering a number of large companies and enterprise groups own core competitiveness. Must take refine locally as the key point, insist that introduces and walks unifies, advance the food processing enterprise's annexation reorganization and the technological transformations positively, guide Leading enterprise through cultivating in the core competitiveness to promote the food industry comprehensively the overall level. Want the food industry specialization, the regionalizing layout, strengthen the food industry base construction, and raise the industrial accumulation benefit, avoiding repetition production.

#### *4.4. The introduction of low-carbon personnel training promote low carbon development*

Low-carbon food industry professionals are both technical personnel and management personnel. In term of training low-carbon personnel, universities and enterprises should carry out low-carbon disciplines of education together, which will be an important way on developing practical low-carbon personnel. In addition, enterprises should strengthen the training of its staff so that staff can adapt to low-carbon age. The training should be for low-carbon market. Only to understand the needs of enterprises, universities can teach relevant skills that enterprises need. Technical staff engaged in product development should attend relevant training courses to help them within the low-carbon industry elite more quickly.

#### *4.5. Cultivate low-carbon foods market, and develop low-carbon marketing*

Speeds up the cultivation and the construction of low-carbon food market, leads the food industry low carbonization development. First, the backing has the strength enterprise group to construct the low-carbon food market, develop low-carbon food wholesale, allocation, surfer, and construct low-carbon food supermarket, develop low-carbon food export trade and marketing and so on. Second, sets up low-carbon food the demonstration market, special counter, chain store, completes the low-carbon food marketing network gradually.

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